

AMENDMENTS TO THE CLAIMS

(IN FORMAT COMPLIANT WITH THE REVISED 37 CFR 1.121)

Please cancel claim 12 without prejudice.

1-2. (CANCELED).

3. (CURRENTLY AMENDED) A method of recording data on a recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

5 mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents a possible N-bit segment of the data and wherein the set of write symbols is defined by:

defining a set of variable write parameters;

10 generating a plurality of candidate write symbols that specify different values for the variable write parameters;

generating a plurality of analog readout waveforms produced by the plurality of candidate write symbols;

15 analyzing the analog readout waveforms to determine a set of distinguishable readout waveforms; and

selecting selected ones of the plurality of candidate write symbols that correspond to the distinguishable readout waveforms to be included in the set of write symbols; and

20 writing the data to the medium using the set of write symbols, wherein a cross correlation coefficient is calculated to recover the data.

4. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the medium is an optical disc.

5. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the medium is a phase change optical disc.

6. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the set of variable write parameters defines characteristics of a sequence of laser pulses.

7. (ORIGINAL) A method of recording data on a medium as recited in claim 3 wherein the set of variable write parameters defines the timing of a sequence of laser pulses.

8. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the medium includes inserting guard bands between the write symbols on a track.

9. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein writing the data to the

medium includes inserting guard bands between the write symbols on  
a track, wherein the guard bands are appropriately sized to avoid  
5 intersymbol interference.

10. (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 3 wherein writing the data to the  
medium includes inserting guard bands between the write symbols on  
a track, wherein the guard bands are appropriately sized to avoid  
5 thermal crosstalk.

11. (PREVIOUSLY PRESENTED) A method of recording data on  
a medium as recited in claim 3 further comprising using matched  
filter detection to recover the data.

12. (CANCELED)

13. (CURRENTLY AMENDED) A method of recording data on a  
medium as recited in claim 3 wherein a combination of ~~a~~ said cross  
correlation coefficient and a comparison of a DC level is used to  
recover the data.

14-15. (CANCELED)

16. (CURRENTLY AMENDED) A method of recording data on a  
recording medium comprising:

dividing the data into N-bit segments, where N is an integer greater than 1;

mapping the data to a set of write symbols comprising  $2^N$  distinct write symbols, wherein each write symbol represents a possible N-bit segment of the data and wherein the set of write symbols is defined by:

defining a set of variable write parameters;

generating a plurality of candidate write symbols that specify different values for the variable write parameters;

generating a plurality of readout waveforms in response to marks produced by the plurality of candidate write symbols;

analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium; and

selecting selected ones of the plurality of candidate write symbols that correspond to the readout waveforms that match the read/write channel that includes the recording medium to be included in the set of write symbols; and

writing the data to the medium using the set of write symbols, wherein a cross correlation coefficient is calculated to recover the data.

17. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write

parameters includes using a genetic algorithm to generate the plurality of candidate write symbols.

18. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes randomly generating the plurality of candidate  
5 write symbols.

19. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate the  
5 plurality of candidate write symbols.

20. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate an initial  
5 set of candidate write symbols and using a genetic algorithm to refine the initial set of candidate write symbols.

21. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the

variable write parameters includes selecting a pair of waveforms to represent individual channel bits.

22. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to represent individual channel bits and shifting and adding combinations of the waveforms.

23. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair of waveforms to represent individual channel bits wherein a spectrum of the pair of waveforms becomes band-limited and resembles a spectrum of a signal-to-noise ratio  $SNR(f)$  of the read/write channel.

24. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium includes determining ideal readout waveforms that follow the read/write channel SNR spectrum.

25. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is an optical disc.

26. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the medium is a phase change optical disc.

27. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines characteristics of a sequence of laser pulses.

28. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein the set of variable write parameters defines the timing of a sequence of laser pulses.

29. (ORIGINAL) A method of recording data on a medium as recited in claim 16 wherein a Viterbi detector is used to recover the data.

30. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises comparing analog readout waveforms obtained from individual segments to waveforms in pre-stored tables using  
5 predetermined pattern recognition techniques.

31. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 11 wherein the matched filter detection comprises:

sampling an analog readout waveform signal;

5 normalizing an amplitude of the sampled signal; and

separating the sampled signal into segments.

32. (CURRENTLY AMENDED) A method of recording data on a medium as recited in claim 31 wherein the matched filter detection further comprises:

calculating ~~a cross-correlation~~ said cross correlation  
5 coefficient between the segments and patterns in a look-up table;  
and

comparing a DC level of the segments with the patterns in the look-up table.

33. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein the variable write parameters comprise one or more of a height of a laser pulse, a duration of a laser pulse, a width of a cooling pulse following a  
5 heating pulse, an interval between adjacent laser pulses, and a power level of a laser pulse.

34. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 3 wherein the analog readout waveforms



are generated by recorded amorphous/crystalline patterns and read from an optical disc.

35. (PREVIOUSLY PRESENTED) A method of recording data on a medium as recited in claim 16 wherein the readout waveforms comprise analog waveforms read from an optical disc and the marks comprise recorded amorphous/crystalline patterns.